

of the apical region of the phyllode and not homologous with the blade of a dicotyledonous leaf. Such a blade among monocotyledons Mrs. ARBER calls a "pseudo-lamina." Such theories have been devised to explain the parallel venation of monocotyledonous leaves. Attention is also called to GRAY's suggestion that some gymnosperm leaves may be equivalent to petioles, and the further suggestion made that this may be applied specially to the Gnetales.

These views were tested by Mrs. ARBER in anatomical investigations, comparing scale-leaves, petioles, and phyllodes of dicotyledons with the leaves of monocotyledons, the conclusion being reached that the occurrence of inverted vascular bundles toward the adaxial face of a leaf may be an indication of "phyllodic morphology." Other indications of phyllodic anatomy are developed, and its systematic distribution shows that it does not occur with any frequency outside the Helobiae, Liliiflorae, and Farinosae. This distribution is taken to confirm the view that phyllodic anatomy is an ancient character, revealing the origin of the monocotyledonous leaf.—J. M. C.

Stomata.—REHFOUS¹¹ has published a detailed study of the stomata of many groups. The details are too numerous for citation, but some of the general conclusions may be indicated. He is convinced that stomata are of first importance in indicating phylogeny and relationships. Their structure he claims is very constant within a group, numerous examples of this being given. For example, the structure of the stomata of the Amentiferae shows that they are nearer the level of the dicotyledons than of the gymnosperms or pteridophytes. In the same way it is shown that the Polypodiaceae constitute a special group, and that the Osmundaceae, Gleicheniaceae, and Schizeaceae approach more nearly the higher plants. A close resemblance is found between the stomata of cycads and conifers, leading to the conclusion that these groups are of common origin. Numerous illustrations of claimed relationships within great groups are either confirmed or contradicted. Several new types of stomata are described, among which those of *Polypodium*, *Platycerium*, *Cycas*, and *Casuarina* may be cited. In connection with the last named genus it is pointed out that its stomata are related to those of certain monocotyledons, as the grasses and certain of the xerophytic Liliaceae. The contribution is a valuable assemblage of facts in reference to the structure of stomata, accompanied by clear illustrations. The conclusions drawn from these facts are open to discussion.—J. M. C.

Water conduction in trees and shrubs.—FARMER¹² has published the results of an investigation of the comparative efficiency of the wood as a water-conducting tissue in about 60 species of plants, chiefly trees and shrubs. The

¹¹ REHFOUS, LAURENT, Étude sur les stomates. Univ. Genève, Inst. Bot. IX. no. 6. pp. 110. figs. 125. 1917.

¹² FARMER, J. BRETLEND, On the quantitative differences in the water-conductivity of the wood in trees and shrubs. Proc. Roy. Soc. B. 90:218-250. 1918.